Supplementary Information for
Properties of Lithium Trivanadate Film Electrode Formed on Garnet- Type Oxide Solid Electrolyte by Aerosol Deposition

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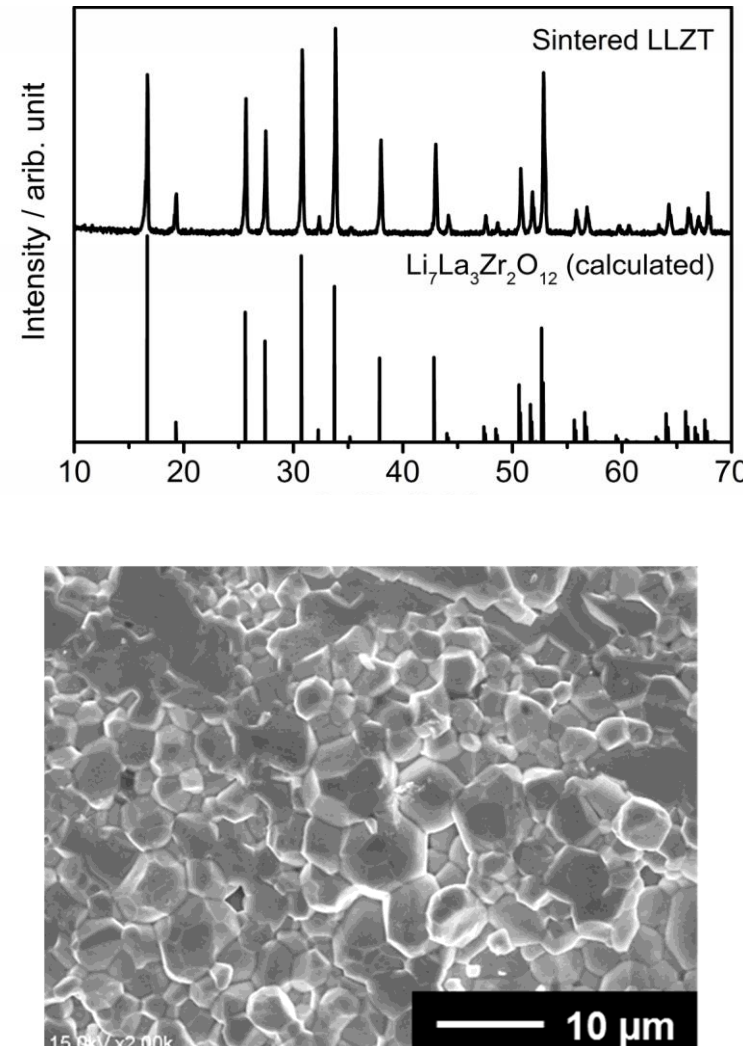

Figure S1. X-ray diffractometer **(**XRD) patterns (**top**) and scanning electron microscope (SEM) image (**bottom**) for sintered $Li_{6.55}La_3Zr_{1.55}Ta_{0.45}O_{12}$ (LLZT) used in this work. LLZT has a cubic garnet structure without any impurity phases and a dense structure composed of LLZT grains with an average size of 5 μm.

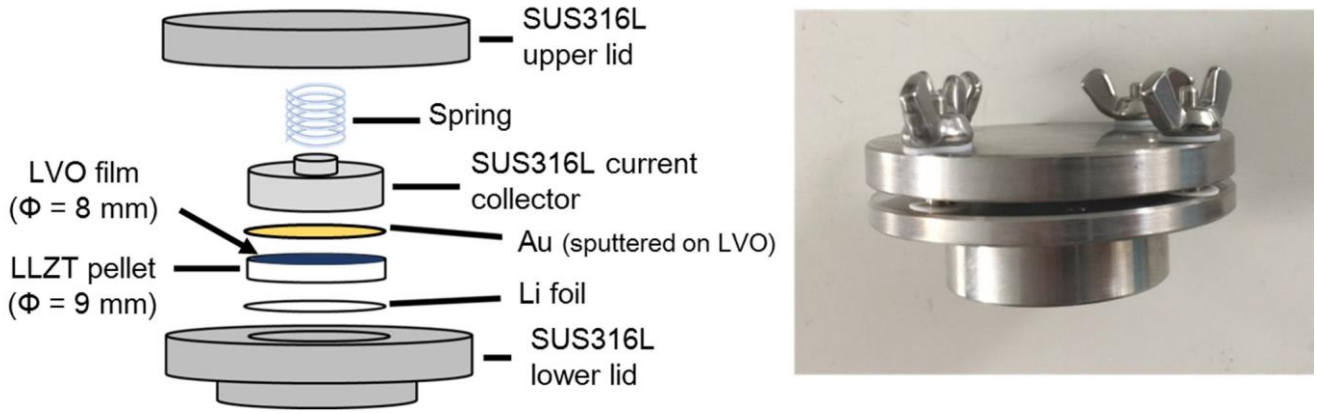

Figure S2. Illustration (**left**) and photo (**right**) of cell fixture for composing a LiV3O8 (LVO)/LLZT/Li all-solid-state cell sample.

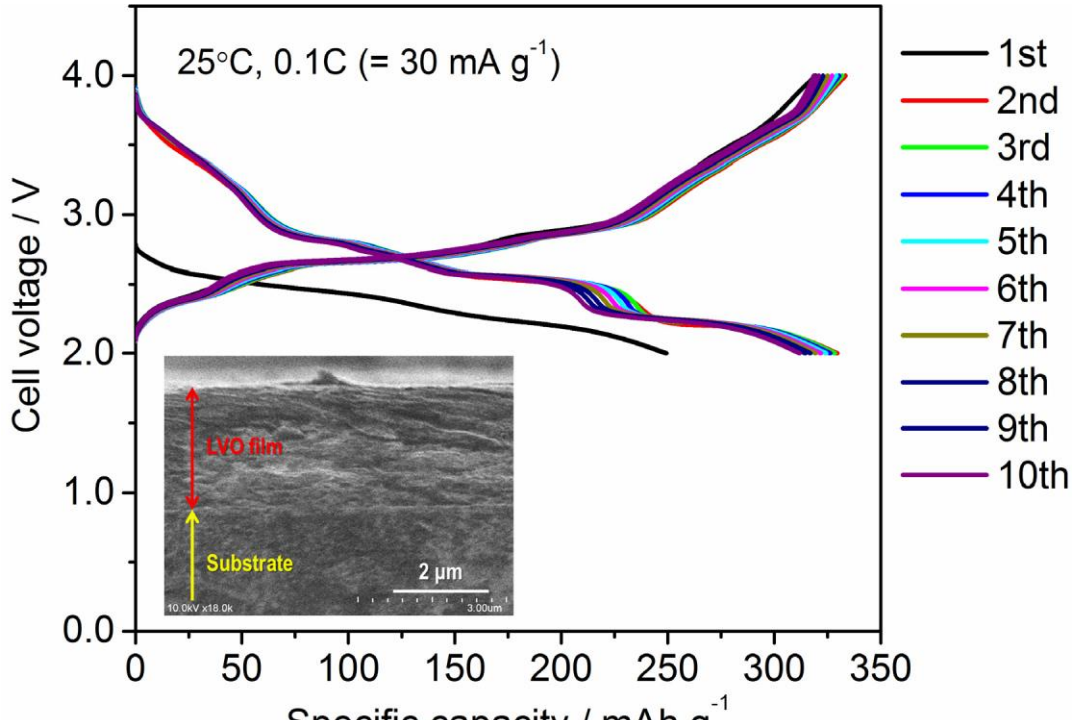

Figure S3. Galvanostatic charge and discharge curves for LVO film electrode (thickness = 2.5 m) formed on a SUS316L plate in an organic liquid electrolyte. LVO film is used as working electrode, where as a single Li foil serves as both counter and reference electrodes. The electrolyte solution was 1 mol $LiPF_6$ in a mixture or ethylene carbonate (EC) and dimethyl carbonate (DMC) with a volume ratio of 1:1. Together with Celgard 3501 as a separator, these components were assembled in a CR2032 coin type cell in a dry Ar filled grove box.

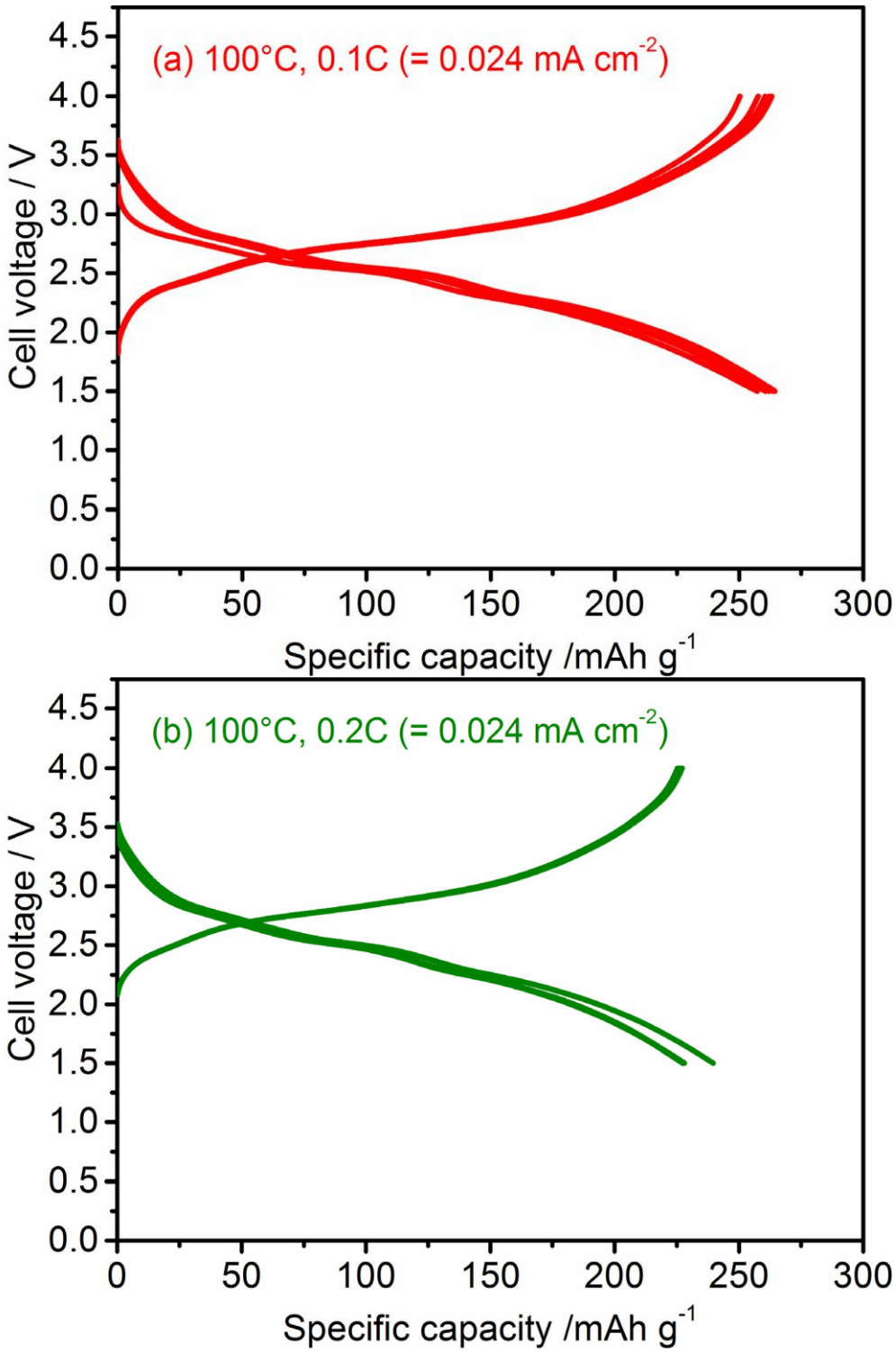

Figure S4. Galvanostatic charge and discharge curves for a LVO/LLZT/Li solid-state cell at 100 C and different current densities: (**a**) 0.030 mA cm^{-2}, (**b**) 0.060 mA cm^{-2}, (**c**) 0.090 mA cm^{-2}, (**d**) 0.120 mA cm^{-2} and (**e**) 0.240 mA cm^{-2}. The measurement at one specific current density is repeated for five cycles. Note that current density of 0.030 mA cm^{-2} corresponds to 30 mA g^{-1} for the LVO electrode.

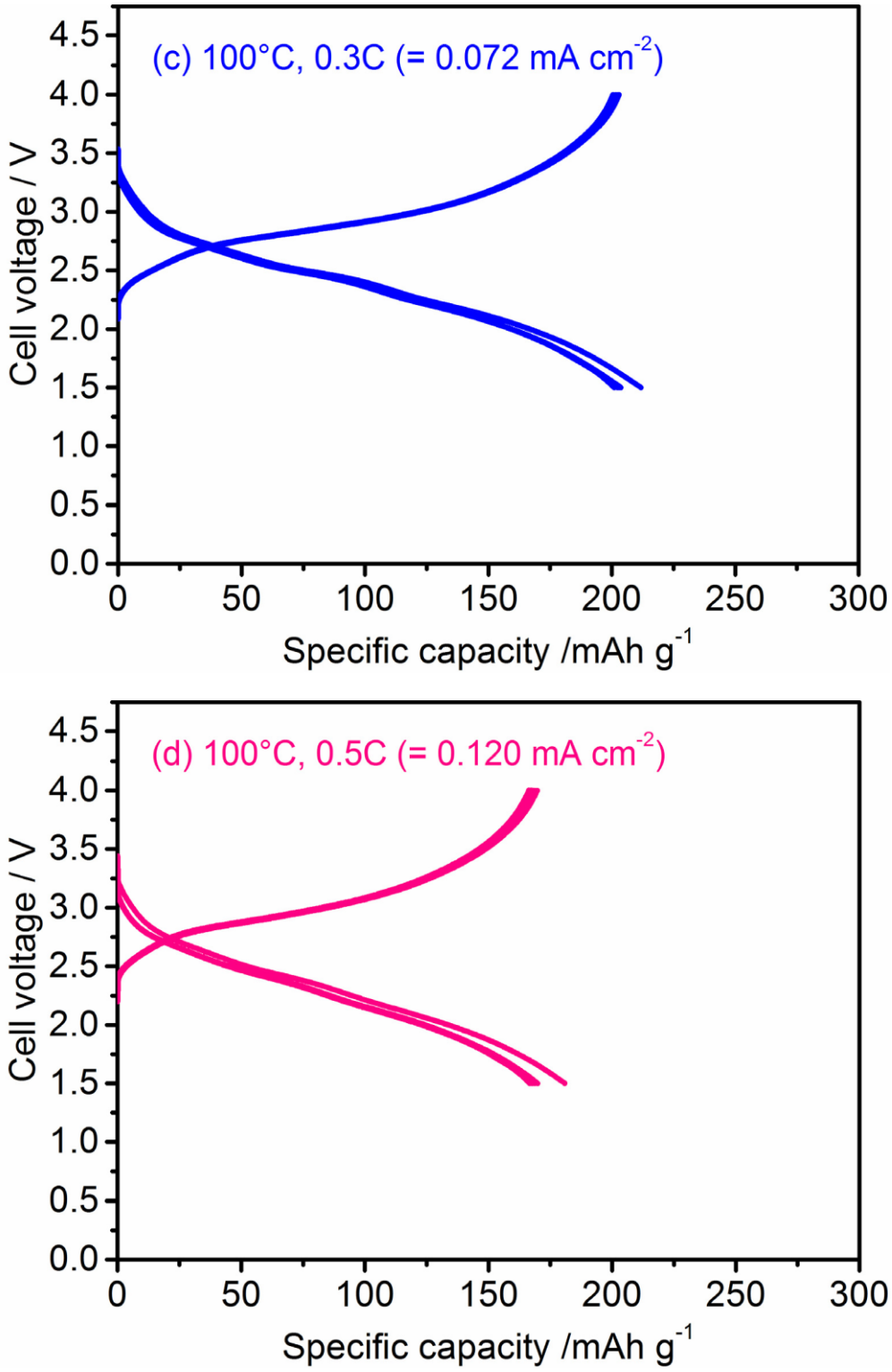

Figure S4. (Continued).

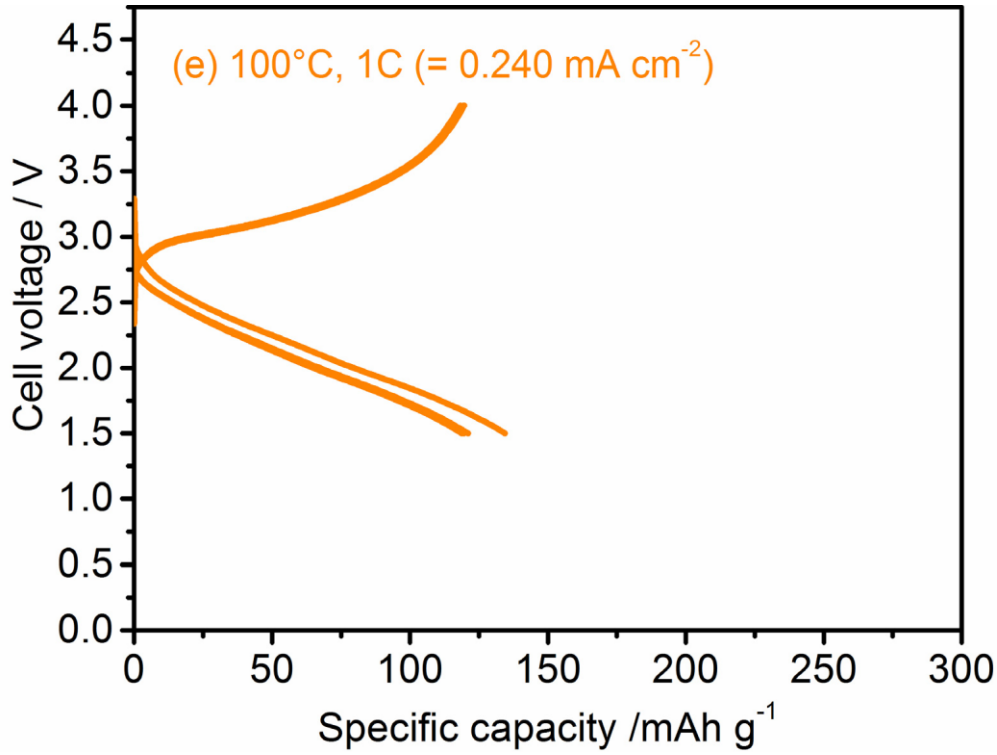

Figure S4. (Continued).